

REMARKS

Claims 1, 3, 8, 9, 12, 13, 16, 17, 22, 30, 31, 34, 35, and 36 are amended, claims 40-49 are canceled without prejudice or disclaimer, and no claims are added; as a result, claims 1-39 are now pending in this application.

Interview Summary

Applicant thanks Examiner Olivia Luk for the courtesy of a telephone interview on February 28, 2005 with Applicant's representative, Sherry Schumm. During the telephone interview, the Examiner requested a provisional election of either group I claims 1-39 (drawn to a process) or group II claims 40-49 (drawn to a device). Sherry Schumm provisionally elected to prosecute group I claims 1-39, without traverse.

Affirmation of Election

As provisionally elected by Applicant's representative, Sherry Schumm, on February 28, 2005, Applicant elects to prosecute the invention of Group I, claims 1-39.

The claims of the non-elected invention, claims 40-49, are hereby canceled without prejudice or disclaimer. Applicant reserves the right to later file continuations or divisions having claims directed to the non-elected inventions.

§102 Rejection of the Claims

Claims 1-12, 17-22, 24, 26-31, 36, 38, and 39 were rejected under 35 U.S.C. § 102(b) for anticipation by Hochberg et al. (U.S. Patent No. 4,981,724). Applicant has amended claims 1, 9, 17, 22, 30, and 36, from which the remaining ones of the rejected claims depend, and respectfully traverses the rejection.

Hochberg et al. disclose chemical vapor deposition (CVD) processes in which the following gasses are reacted:

Case 1:	$\text{SiH}_4 + \text{O}_2$	(col. 11, line 14)
Case 2:	$4\text{PH}_3 + 5\text{O}_2$	(col. 11, line 16)
Case 3:	$\text{SiH}_4 + 2\text{N}_2\text{O}$	(col. 11, line 47)
Case 4:	$\text{SiH}_2\text{Cl}_2 + 2\text{N}_2\text{O}$	(col. 12, line 22).

In contrast to that which is disclosed in Hochberg et al., Applicant's claims 1-12, 17-22, 24, 26-31, 36, 38, and 39 include at least the following distinguishing features:

"... passing reaction gasses over the substrate . . . , wherein the reaction gasses include a silicon bearing component, the oxidizing component, and a chloride component, and wherein the silicon bearing component and the chloride component are included within distinct ones of the reaction gasses . . ." (claims 1-8, 17-21, 30, and 31)

"... passing reaction gasses over the substrate, wherein the reaction gasses include a precursor component, the oxidizing component, an ammonia component, and a chloride component, and wherein the precursor component and the chloride component are included within distinct ones of the reaction gasses introduced into the chamber . . ." (claims 22, 24, and 26-29)

"... passing reaction gasses over the substrate, wherein the reaction gasses include a silicon bearing component, the oxidizing component, and chlorine, and wherein the silicon bearing component and the chlorine are included within distinct ones of the reaction gasses . . ." (claims 9-12)

"... thermally oxidizing the silicon substrate, in the furnace tube, using gaseous reactants, which include a chloride component, dichlorosilane, and nitrous oxide, wherein the chloride component and the dichlorosilane are included in distinct gasses introduced into the furnace deposition tube." (claims 36, 38, and 39)

Hochberg et al. do not disclose features of Applicant's claims, listed above. Specifically, nowhere do Hochberg et al. disclose passing reaction gasses over a substrate (or thermally oxidizing a substrate), where a silicon bearing component (or dichlorosilane or a precursor component) and a chloride component (or chlorine) are included in distinct reaction gasses. As discussed above, Hochberg et al. does discuss one case (Case 4) in which SiH_2Cl_2

(dichlorosilane) is reacted with $2\text{N}_2\text{O}$ (nitrous oxide). (see. Hochberg et al., col. 12, lines 18-22). However, in this case, silicon and chloride form portions of the same gas, namely, the dichlorosilane. There is no distinctly introduced gas, within the specification of Hochberg et al., which includes a chloride component (or chlorine), as is claimed in Applicant's claims.

Applicant believes that Hochberg et al. do not disclose the features of Applicant's claims 1-12, 17-22, 24, 26-31, 36, 38, and 39. Based on the amendments and remarks, above, Applicant believes that the rejection of these claims under 35 U.S.C. § 102(b) has been overcome. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw this rejection, and that these claims be allowed.

§103 Rejection of the Claims

Response to Rejection of Claims 13-16, 20, 28, 32, 33, and 37:

Claims 13-16, 20, 28, 32, 33, and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hochberg et al. in view of Ishitani (U.S. Patent No. 5,330,936). Applicant has amended claims 13, 17, 22, 30, and 36, from which claims 14-16, 20, 28, 32, 33, and 37 depend, and respectfully traverses the rejection.

Claims 20, 28, 32, 33, and 37 depend from claims 17, 22, 30, and 36, respectively. In conjunction to the response, given above, to the rejection of claims 17, 22, 30, and 36 under 35 U.S.C. § 102(b), Applicant believes that claims 17, 22, 30, and 36 are distinguishable over Hochberg et al. By virtue of their dependence on these claims, Applicant further believes that claims 20, 28, 32, 33, and 37 are distinguishable over Hochberg et al. Applicant does not believe that the combination of Ishitani with Hochberg et al. renders these claims unpatentable, as is explained in more detail, below.

Ishitani discloses a method of producing a silicon nitride film using chemical vapor deposition (CVD), where a source gas of ammonia and either silane or dichlorosilane is doped with hydrogen chloride gas. (col. 2, lines 50-57)

In contrast to that which is disclosed in Hochberg et al., Ishitani or their combination, Applicant's claims 13-16, 20, 28, 32, 33, and 37 include at least the following distinguishing features:

“ . . . passing reaction gasses over the substrate . . . , wherein the reaction gasses include a silicon bearing component, the oxidizing component, and a chloride component, and wherein the silicon bearing component and the chloride component are included within distinct ones of the reaction gasses . . .” (claims 20, 32, and 33)

“ . . . passing reaction gasses over the substrate, wherein the reaction gasses include a precursor component, the oxidizing component, an ammonia component, and a chloride component, and wherein the precursor component and the chloride component are included within distinct ones of the reaction gasses introduced into the chamber . . .” (claim 28)

“ . . . passing reaction gasses over the substrate, wherein the reaction gasses include a silicon bearing component, the oxidizing component, and hydrogen chloride, and wherein the silicon bearing component and the hydrogen chloride are included within distinct ones of the reaction gasses . . .” (claims 13-16)

“ . . . thermally oxidizing the silicon substrate, in the furnace tube, using gaseous reactants, which include a chloride component, dichlorosilane, and nitrous oxide, wherein the chloride component and the dichlorosilane are included in distinct gasses introduced into the furnace deposition tube.” (claim 37)

Specifically, neither Hochberg et al., Ishitani, nor their combination disclose, suggest or motivate the features of Applicant's claims, listed above. Specifically, nowhere do Hochberg et al., Ishitani, or their combination disclose passing reaction gasses over a substrate (or thermally oxidizing a substrate), wherein the reaction gasses include a silicon bearing component (or dichlorosilane or a precursor component), an oxidizing component (or nitrous oxide), and a chloride component (or hydrogen chloride), and where a silicon bearing component (or

dichlorosilane) and a chloride component (or hydrogen chloride) are included in distinct reaction gasses.

Applicant believes that neither Hochberg et al., Ishitani, nor their combination disclose, suggest, or motivate the features of Applicant's claims 13-16, 20, 28, 32, 33 or 37. Based on the above remarks and the amendments to base claims 13, 17, 22, 30, and 36, from which claims 14-16, 20, 28, 32, 33, and 37 depend, Applicant believes that the rejection of these claims under 35 U.S.C. § 103(a) has been overcome. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw this rejection, and that these claims be allowed.

Response to Rejection of Claims 23 and 25:

Claims 23 and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hochberg et al. in view of Chung et al. (U.S. Patent No. 6,838,125). Applicant has amended claim 22, from which claims 23 and 25 depend, and respectfully traverses the rejection.

Claims 23 and 25 depend from claim 22. In conjunction to the response, given above, to the rejection of claim 22 under 35 U.S.C. § 102(b), Applicant believes that claim 22 is distinguishable over Hochberg et al. By virtue of their dependence on claim 22, Applicant further believes that claims 23 and 25 are distinguishable over Hochberg et al. Applicant does not believe that the combination of Chung et al. with Hochberg et al. renders these claims unpatentable, as is explained in more detail, below.

Chung et al. disclose a method of film deposition using a precursor component that contains tantalum. (col. 8, lines 1-7).

In contrast to that which is disclosed in Hochberg et al., Chung et al. or their combination, Applicant's claims 23 and 25 include at least the following distinguishing features:

“ . . . passing reaction gasses over the substrate, wherein the reaction gasses include a precursor component, the oxidizing component, an ammonia component, and a chloride component, and wherein the precursor component and the chloride component are included within distinct ones of the reaction gasses introduced into the chamber . . .” (claim 22)

“ . . . wherein the precursor component includes at least one component selected from the group consisting of a silicon bearing component, a tantalum bearing component, and an aluminum bearing component, in any combination” (claim 23)

OR

“ . . . wherein the precursor component consists essentially of a tantalum bearing component.” (claim 25)

Specifically, neither Hochberg et al., Chung et al., nor their combination disclose, suggest or motivate the features of Applicant's claims, listed above. Specifically, nowhere do Hochberg et al., Chung et al., or their combination disclose passing reaction gasses over a substrate, wherein the reaction gasses include a precursor component (e.g., a silicon bearing component, a tantalum bearing component, an aluminum bearing component, or a combination thereof), an oxidizing component, an ammonia component, and a chloride component, and where a precursor component and a chloride component are included in distinct reaction gasses.

Applicant believes that neither Hochberg et al., Chung et al., nor their combination disclose, suggest, or motivate the features of Applicant's claims 23 or 25. Based on the above remarks and the amendments to base claim 22, from which claims 23 and 25 depend, Applicant believes that the rejection of these claims under 35 U.S.C. § 103(a) has been overcome. Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw this rejection, and that these claims be allowed.

Support for Claim Amendments

Support for the amendments to claims 1, 9, 13, 17, 22, 30, and 36 may be found, for example, in the originally filed Specification at page 6, lines 16-27.

Allowable Subject Matter

Claims 34 and 35 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant has amended claims 34 and 35 to be in independent form, including all of the limitations of base claim 30 (no claims are intervening). Applicant believes that these amendments overcome the objection to claims 34 and 35. Accordingly, Applicant respectfully requests that the objection be reconsidered and withdrawn, and that claims 34 and 35 be allowed.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, Sherry Schumm, at (480) 538-1735 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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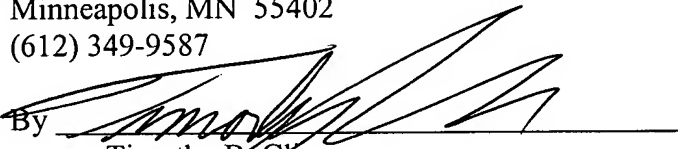
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 15 day of June, 2005.

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